REVIEW OF MARICOPODYNERUS (HYMENOPTERA: EUMENIDAE)

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Abstract.—The 16 known species of the genus include 7 described as new here. A key to the species is given along with illustrations of important characters. Additional locality records are included for previously described forms. New species are; arizonicus, Arizona, New Mexico; differens, Arizona, Nevada, California; festivus, Texas, Arizona; linsleyi, southern California; lissoides, Texas, New Mexico, Nueva Leon; optimus, New Mexico, Arizona; sternalis, California.

Key Words: wasps, Eumenidae, Maricopodynerus

H. L. Viereck described *Maricopodynerus* (1908) as a subgenus of *Odynerus* for the single new species, *maricoporum*. Bohart (1948) elevated it to generic rank and added 2 new species. Then, in a revisionary effort, Bohart (1950) added 4 more species. At that time less than 150 specimens of the genus were known. Now I have seen more than 400 and among them are 7 new species described herein. This brings the total to 16, all west of the 100th meridian in United States and Mexico.

The generic characters were given by Bohart (1950). *Maricopodynerus* is unique in its greatly enlarged, posteriorly membranous second tergum which is twice as long as the second sternum, and can enclose the remaining terga (Figs. 22–24). Specific characters of most importance are clypeal shape, punctation, and color pattern. Male genitalia are rather similar except in *sericifrons* and *arizonicus* (Figs. 17, 18).

More than one species may occur in a single locality; for example, *sericifrons* and *linsleyi* at Palm Springs, California; *rudiceps* and *decorabilis* at Boca, California; *maricoporum* and *differens* at Oak Creek Canyon, Arizona; and *lissoides* and *festivus* in

Santa Elena Canyon of Big Bend Park, Texas.

Type depositories indicated with the descriptions are: Academy of Natural Sciences (San Francisco), British Museum of Natural History (London), Los Angeles County Museum (Los Angeles), University of Arizona (Tucson), University of Idaho (Moscow), Harvard University (Cambridge), University of California Bohart Museum (Davis), University of Kansas Snow Museum (Lawrence), U.S. National Museum (Washington), Oregon State University (Corvallis).

Abbreviations used are F-I etc., flagellomere; MOD, median occllus diameter; PD, puncture diameter; T-I etc., terga; S-I etc., sterna.

Key to the Species of Maricopodynerus

 T-II posterior ivory band deeply u-shaped medially (Figs. 10, 12)
T-II posterior ivory band not deeply u-shaped medially (as in Fig. 11)

3

2. Vertex swollen and partly polished behind ocelli, forewing marginal cell darkened toward apex (as in Fig. 20) . artzonicus Bohart Vertex not swollen, punetation close and

	coarse; forewing marginal cell not darkened	
2	toward apex (Fig. 21) optimus Bol	nart
3.	Forewing marginal cell not at all darkened	4
	toward apex	4
	Forewing marginal cell somewhat darkened	
	in apical third or fourth, especially in females	7
4.	Tanula block and ivone on come dark and and	1
4.	Tegula black and ivory or very dark red and ivory; propodeum black posteriorly or mostly	
	so; male clypeus with black apical rim, female	
	clypeus all black rudiceps Bol	
	Tegula light or bright red and ivory; propo-	1411
	deum red posteriorly; male clypeus without	
	black apical rim; female clypeus with consid-	
	erable red	5
5.		3
J.	stout (Fig. 19), male F-XI stout, less than twice	
	as long as thick in lateral profile, female clyp-	
	eus all red and black sericifrons Bol	aart
	Forewing marginal cell more slender (shaped	14111
	about as in Fig. 20 or 21), male F-XI slender,	
	more than twice as long as thick in lateral	
	profile, female clypeus nearly always with some	
	ivory marks	6
6.	T-11 with considerable red along inner margin	Ü
0.	of ivory, female pronotum mostly red dor-	
	sally, female postocular spot encircled with	
	red chisosensis Bol	art
	T-II with little or no red along inner ivory	
	margin, female pronotum not mostly red dor-	
	sally, female postocular spot not encirled with	
	red maricoporum (Viere	eck)
7.	T-II lateral spot isolated from marginal ivory	,
	band (as in Fig. 22), male clypeus with free	
	apical margin black rimmed (as in Fig. 5),	
	female clypeus black with lateral ivory spot	
	(as in Fig. 1) or all black	8
	T-11 lateral spot attached to marginal ivory	
	band (as in Fig. 23), male clypeus with free	
	apical margin pale, female clypeus usually	
	partly red but never all black	10
8.	T-I black except for posterior ivory band, T-II	
	punctation rather coarse (Fig. 14)	
	festivus Bol	iart
	T-l mostly or all red except for ivory band,	
	T-11 punctation unusually fine (as in Fig. 16)	
		9
9.	S-II mostly or all dark; female clypeus all black;	
	T-II punctures small, somewhat effaced by	
	microsculpture . decorabilis Bol	ıart
	S-II mostly or all bright red; female clypeus	
	black with 2 white spots (Fig. 1); T-II punc-	
	tures small, but their outlines distinct (Fig.	
	16) sternalis Bol	art
10.		
	terior depression absent or practically so	11
	T-II punctation distinct along midline .	12

11.	T-II practically impunctate in midposterior depression, female mandible not unusually thick or bluntly curved toward apex
	T-II distinctly punctate in midposterior
	depression, female mandible thick and bluntly
	curved toward apex permandibularis Bohart
12.	T-ll punctation coarse, rather evenly distrib-
	uted, most punctures 1 PD or less apart
	differens Bohart
	T-II punctation fine and/or unevenly distrib-
	uted with most anteromedial punctures 2 or
	3 PD apart
13.	T-ll with anterior half mostly polished in me-
	dian area, punctures sparse (Fig. 13)
	lissus Bohart
	T-II with numerous punctures in median area
	(Fig. 15) = = 14
14.	T-II punctures in lateral emargination of ivo-
	ry band exceptionally coarse, some almost as
	large as midocellus lissoides Bohart
	T-II punctures somewhat enlarged in emar-
	gination of ivory band but much smaller than
	midocellus
15.	
10,	shallow between sharp teeth (Figs. 2, 6); clyp-
	eus of male lightly microsculptured but a little
	shiny, that of female normally convex
	Clypeus unusually short, apical emargination

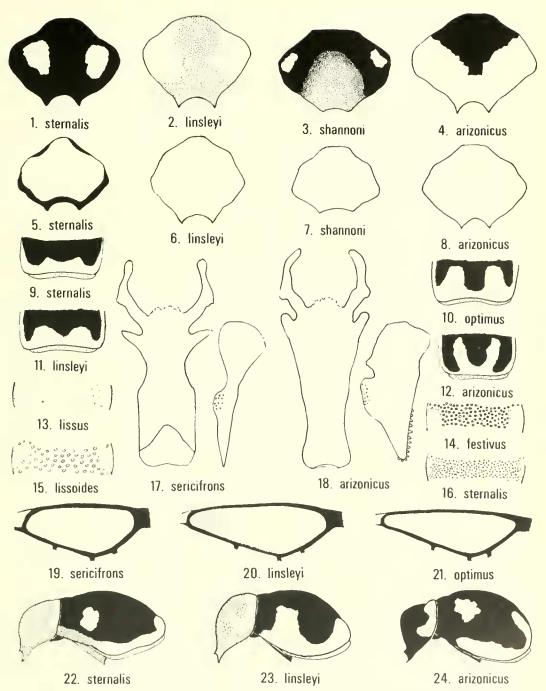
Maricopodynerus arizonicus Bohart, New Species

quite shallow (Figs. 3, 7); clypeus of male densely microsculptured and dull, that of fe-

. shannoni Bohart

male unusually flat

Male holotype.—Length 7 mm. Black, ivory, and reddish brown. Ivory are: clypeus, dot above, ocular and postocular spots, pronotum anterodistally, 2 spots on tegula, 2 spots on scutellum, metanotal band, large upper mesopleural spot, distal spots on fore and midfemora, tibiae outwardly, irregular recurved band on T-1, markings on T-II (Fig. 24); posterolateral spot on S-II, reddish brown are: flagellum inwardly, mandible, pronotal edge posteriorly, legs mostly, central spot on tegula, terminal tergal and sternal segments; wings slightly dusky, forewing marginal cell darkened in front and on distal third. Pubescence pollinose, silvery on head and thorax, fulvous on distal third. Pubes-



Figs. 1–24. 1–4, clypeal pattern, females, \times 30; 5–8, clypeal shape, males, \times 30; 9–12, T-11 pattern, posterior view, males, \times 18; 13–16, punctation across T-II opposite lateral spot, females, \times 18; 17, 18, flattened aedeagus and cuspis, \times 60; 19–21, forewing marginal cell, females, 19, 20, \times 40, 21, 45; 22–24, T-1-II pattern, lateral, males, \times 20. Stippled areas of Figs. 2, 3, 22, 23, red.

cence pollinose, silvery on head and thorax, fulvous on T-II. Punctures moderate and sparse on clypeus, moderately coarse and close on frons, irregularly spaced across vertex, moderate and somewhat spaced on notum, pleuron and T-I, punctures of T-II moderately coarse and rather evenly spaced about a PD apart. Clypeal apex obtusely emarginate between sharp teeth (Fig. 8); F-XI small, not reaching base of IX; vertex swollen, forming a low smooth transverse swelling behind ocelli and a barely perceptible swelling near compound eye; cuspis with a row of teeth along inner edge (Fig. 18).

Female.—About as in male except: length 8 mm, clypeus more coarsely punctate and with a dark basal triangle (Fig. 4), reddish brown of legs as far as tibiae replaced by red, propodeum and T-I mostly red.

Holotype male, 5 mi w. Portal, Chiricahua Mts., Cochise Co., Arizona, VIII-7-58 (R. M. Bohart, DAVIS). Paratypes, 10 males, 21 females, topotypical, VIII-6 to VIII-22 (R. M. Bohart, SAN FRANCISCO, WASHINGTON, DAVIS). Other specimens, not paratypes, VII-IX, 6 males, 1 female, Arizona: 5 mi w. Portal, Patagonia and 6 mi se.; New Mexico: 11 mi wsw. Carrizozo, Rockhound State Park (Luna Co.), 18 mi w. Guthrie.

Discussion.—The deeply divided black markings posteriorly on T-II (Fig. 12), together with the partly polished vertex and darkened apex of the forewing marginal cell, characterize the species.

MARICOPODYNERUS CHISOSENSIS BOHART

Maricopodynerus chisosensis Bohart 1950: 20. Holotype male, Chisos Mts., Brewster Co., Texas (WASHINGTON). The red coloration is usually extensive, bordering the ivory postocular spot and ivory band of T-II. Also, the female clypeus and pronotum are mostly red. The species is known only from Texas in Brewster Co. (type series), and 2 females in Terre Co. and Sanderson Co. (W. F. Barr, MOSCOW).

Maricopodynerus decorabilis Bohart

Maricopodynerus decorabilis Bohart 1950: 22. Holotype male, Leavitt Meadows, Mono Co., California (SAN FRANCISCO).

Obviously similar to *sternalis* by its small size, less rotund T-II, and free spot on T-II, this species has the T-II punctures more shallow and partly effaced by microsculpture. Also, S-II is black instead of red. It is known from southeast Oregon and eastern California as far south as Inyo Co. Many of the 24 specimens I have seen were taken at or near Boca, Nevada Co., California on *Chrysothamnus* in July.

Maricopodynerus differens Bohart, New Species

Male holotype.—Length 7.5 mm. Black, ivory, and red. Ivory markings as described for *optimus* except 2 tegular spots, a distal one on midfemur, and less extensive T-II spots posteriorly; red markings as in *optimus* except propodeum laterally and posteriorly; T-I basally; forewing marginal cell darkened in apical half. Pubescence silvery, inconspicuous. Punctation as described for *optimus*, that of T-II as in Fig. 14. Clypeal apex obtusely emarginate between angular teeth, F-XI reaching base of F-IX, lateral ivory margin of T-II moderately swollen, cuspis without teeth.

Female.—About as in male: length 7.5–8.5 mm; femora all red, propodeum all or mostly red, T-I usually red except for posterior ivory band; clypeus more coarsely punctate, red and ivory or more often red, black, and ivory.

Holotype male, Oak Creek Canyon, Coconino Co., Arizona, VI-11-40 (R. M. Bohart, DAVIS). Paratypes (all DAVIS except as noted), Arizona: III-VI, 5 males, 3 females, Maricopa Mts., 4 mis. Hoover Dam (Mojave Co., MOSCOW), 4 min. White River (TUCSON), Superior (TUCSON), Sedona (TUCSON), Lake Mojave; California: 2 males, 9 females, IV-VIII, Surprise Canyon and Big Pine Canyon (Inyo Co.),

near Bishop and Topaz Lake (Mono Co., DAVIS, SAN FRANCISCO); Nevada: 2 males, 4 females, IV-VIII, Nelson, 5 mi e. Carson City, Mt. Montgomery, 2 mi e. Tonopah.

Discussion.—The coarse and rather evenly distributed punctures of T-II, the apically darkened forewing marginal cell, and the absence of a free spot on T-II, taken together are differentiating.

Maricopodynerus festivus Bohart, New Species

Male holotype.—Length 5.5 mm. Black, ivory and red. Ivory are: clypeus except black apical rim, dot above, ocular and postocular spots, irregular anterior pronotal margin, scuttelar spots, metanotal band, anterior tegular dot, mesopleural spot, forefemoral spot, tibial streaks, posterior T-I band, T-II markings (about as in Fig. 22), apicolateral spot on S-II; red are: flagellum inwardly, tegula mostly, legs mostly (as far as tibiae); forewing marginal cell a little darkened distally. Pubescence silvery, inconspicuous. Punctures moderate on shagreened clypeus, moderate and close on frons and notum. moderately coarse and close but evenly spaced on T-I-11 (as in Fig. 14). Clypeal apex obtusely emarginate between sharp teeth.

Female.—About as in male except: length 6.5 mm, clypeus black with lateral ivory spot, coarsely punctate, marginal wing cell more darkened in distal third.

Holotype male, Santa Elena Canyon, Big Bend National Park, Texas, Brewster Co., IV-9-65 (D. Bolinger, DAVIS). Paratypes, 3 females, IV-19-54 (R. H. Beamer, LAW-RENCE, DAVIS); 1 female, Sabino Canyon, Santa Catalina Mts., Arizona, V-5-55 (F. G. Werner, TUCSON).

Discussion.—Although similar to differens in the marginal cell and punctation of T-II, there are several points of difference. In festivus the scape, propodeum, and basal three-fourths of T-I are black. The clypeal apex is more sharply toothed, and the fe-

male clypeus is black with 2 ivory spots. Finally, the anterior ivory spot of T-II is isolated from the lateral mark.

Maricopodynerus linsleyi Bohart, New Species

Male holotype.—Length 6.8 mm. Black or dark reddish brown, ivory and red. Ivory are: same areas given for arizonicus except T-II spots attached laterally and posterior spots smaller (Figs. 11, 23); red are: flagellum inwardly, tegula medially, posterior edge of pronotum, legs mostly, propodeum, T-I except for ivory border; forewing nearly clear except dusky distal third of marginal cell. Pubescence as described for arizonicus. Punctures of clypeus small and sparse, those of frons, vertex, and notum moderately coarse and close; those of mesopleuron well separated, those of T-II moderate and about a PD apart anteriorly but becoming close beyond middle. Clypeal apex shallowly emarginate between sharp teeth (Fig. 6), F-XI moderately slender, nearly reaching base of F-IX; T-II ivory margin not overhanging membranous edge laterally; cuspis without teeth.

Female.—About as in male except: clypeus more coarsely punctate and bimaculate red and ivory (Fig. 2); anterior half of T-II with punctures usually 1–3 PD apart.

Holotype male, Palm Springs, Riverside Co., California VII-6-75, on *Dalea spinosa* (E. G. and J. M. Linsley, DAVIS). Paratypes, I1 males, 30 females, topotypical, VI-17 to VII-6 (E. G. and J. M. Linsley, SAN FRANCISCO, DAVIS); 3 males, 7 females, Corn Springs, Chuckwalla Mts., Riverside Co., California (LOS ANGELES, DAVIS); 3 males, 17 females, Shaver's Well, Riverside Co., California (LOS ANGELES, DAVIS). Other specimens, typical but not paratypes, California: Westmorland, Indio, Palm Springs, Brawley, Winterhaven (DAVIS).

Discussion.—Features of the marginal cell (Fig. 20), T-II markings (Figs. 11, 23), and clypeus (Figs. 2, 6) are given in the key. T-II

is fairly well punctate but in the anterior half there are considerable polished intervals, but less so than in *lissus* (Fig. 13). Lateral punctation of T-II separate *lissoides* and *linsleyi*, which also has the clypeal apex more sharply emarginate. This last feature also distinguishes *linsleyi* and *shannoni* (Figs. 2, 3, 6, 7). The species is named for the eminent Coleopterist and Hymenopterist, my friend, E. Gorton Linsley.

Maricopodynerus lissoides Bohart, New Species

Male holotype.—Length 7 mm. Black, ivory and red. Markings and pubescence as described for *linsleyi*. Punctures of clypcus small and sparse, those of frons, vertex and notum moderate and slightly separated; those of mesopleuron about 1.0–1.5 PD apart; those of T-II coarse and 1.0–1.5 PD apart on anterior half (Fig. 15), becoming closer posteriorly; those in lateral emargination of ivory band quite coarse and close. Clypeal apex weakly indented between blunt teeth, F-XI small, not reaching base of T-IX, ivory margin of T-II overhanging membranous edge laterally, cuspis without teeth.

Female.—About as in male except: length 8 mm, clypeus bicolored red and ivory and more coarsely punctate, apex nearly truncate.

Holotype male, Santa Elena Canyon, Big Bend National Park, Brewster Co., Texas, VIII-25-67 (R. Gardner, C. Kovacic, DA-VIS). Paratypes, 1 male, 17 females, topotypical, VIII-22-25-54 (R. M. Bohart, SAN FRANCISCO, DAVIS, WASHINGTON); 5 males, Big Bend National Park, Texas, April (R. M. Bohart, D. Bolinger, COR-VALLIS, DAVIS). Other specimens, not paratypes, 11 males, 2 females, Texas: 25 mi s. Marathon, Stillwell Crossing and Study Butte (Brewster Co.), Lajitas; New Mexico: 11 mi wsw. Carrizoza, Organ Mts., Peloncillo Mts.; Nueva Leon: near Monterrey, Mexico.

Discussion.—Differences from *linsleyi* are given under that species, and in the key.

Maricopodynerus lissus Bohart

Maricopodynerus lissus Bohart 1950: 23. Holotype male, Maricopa Mts., Arizona (SAN FRANCISCO).

The much reduced punctation of T-II (Fig. 13) characterizes *lissus*, and the extensive smooth areas are surpassed only by *pulvi-pilus*. The 37 specimens I have seen came from southwest New Mexico, Arizona, and southeast California.

Maricopodynerus maricoporum (Viereck)

Odynerus (Maricopodynerus) maricoporum Viereck 1908: 397. Holotype male, Oak Creek Canyon, Coconino Co., Arizona (LAWRENCE).

Odynerus chelonogastrus Cameron 1908: 202. Holotype female (no abdomen), Jerome, Yavapai Co., Arizona (LONDON). New synonymy.

This generotype species is quite similar to *lissoides* but the apically pigmented forewing marginal cell of the latter is differentiating. I have seen both types listed above and about 80 other specimens from castern California (Inyo Co. to Imperial Co.), eastern and southern Nevada, Arizona, southern New Mexico, southwestern Texas, and southern Utah (Leeds).

Maricopodynerus optimus Bohart, New Species

Male holotype.—Length 7 mm. Black, ivory, and red. Ivory are: clypeus, scape in front, ocular and postocular spots, pronotum anterodorsally, tegular spot, 2 scutellar spots, metanotal band, upper mesopleural spot, distal spot on forefemur, tibiae outwardly, irregular recurved band on T-I, markings on T-II (Fig. 10 and as in 23), subapical band on S-II; red are: flagellum weakly toward inner apex, mandible, pronotal edge posteriorly, tegula mostly, legs mostly; forewing marginal cell not darkened toward apex. Pubescence silvery, as long as 1 MOD on face and propodeum. Punctures moderate and a PD apart on clypeus, coarse

and close on face and notum; punctures of T-II coarse, rather evenly distributed, mostly less than 1 PD apart, unusually coarse in lateral and posterior emarginations of ivory band. Clypeal apex obtusely emarginate between sharp teeth, F-XI reaching apical two-fifths of F-VIII, ivory margin of T-II overhanging membranous edge laterally.

Female. — About as in male except: length 8.5–9.0 mm, clypcus more coarsely punctate, black with 2 ivory spots (as in Fig. 1); pronotal band broken submedially, lateral spot of T-II sometimes unattached.

Holotype male, Dripping Spring, Organ Mts., Dona Ana Co., New Mexico (C. Townsend, WASHINGTON). Paratypes, female, New Mexico: topotypical (T. Cockerell, WASHINGTON); female, Texas: The Basin, Big Bend National Park, Brewster Co., X-4-56 (J. W. MacSwain, SAN FRANCISCO); Arizona: 2 females, Lower Madera Canyon, Santa Rita Mts., VI-1-61 (J. Bequaert, CAMBRIDGE, DAVIS).

Discussion.—The rather deeply divided ivory markings posteriorly on T-II (Fig. 10) are rivalled only by *arizonicus* which is easily separated by its somewhat bulging and polished vertex, as well as the stained forewing marginal cell.

Maricopodnerus permandibularis Bohart

Maricopodynerus permandibularis Bohart 1948: 321. Holotype female, Tiburon Island, Gulf of California, Mexico (SAN FRANCISCO).

Known only from the type female, the stout, blunt mandibles are diagnostic. The punctation of T-II is similar to that of *lissus*.

MARICOPODYNERUS PULVIPILUS BOHART

Maricopodynerus pulvipilus Bohart 1948: 321. Holotype male, Tortuga Island, Gulf of California, Mexico (SAN FRANCISCO).

In addition to the 6 specimens of the type series from Baja California Sur, 1 have before me 7 males, 7 females collected by L. D. French and E. O. Sugden 35 km s. Mulege, Baja California Sur, IV-I-80 (DAVIS).

Also, there are 5 females (LOS ANGELES), 5 mi nw. San Ignacio, Baja California Sur, IX; and 13 km nw. Rosarito, Baja California, IX. The practical absence of punctation on T-II, including the posteromedial depression, is characteristic.

Maricopodynerus rudiceps Bohart

Maricopodynerus rudiceps Bohart 1950: 21. Holotype male, Verdi, Nevada (SAN FRANCISCO).

The moderate development of the T-II ivory band posteriorly (about as in Fig. 11), even coloration of the forewing marginal cell, all-black female clypeus, and black-rimmed male clypeus will differentiate *rudiceps* from other species with close, coarse T-II punctation. This species is rather widely distributed in western United States from southeastern Washington to central Montana, south to eastern California as far as Mono Co., and in northern Arizona. I have before me several hundred specimens collected at Boca, Nevada Co., California, VII (DAVIS).

Maricopodynerus sericifrons Bohart

Maricopodynerus sericifrons Bohart 1950: 19. Holotype male, 2 mi w. Edom, Riverside Co., California (SAN FRANCISCO).

This species can be distinguished by the clarity and stout shape of the forewing marginal cell (Fig. 19), by the limited lateral extent of the posterior membrane of T-11, and by the spade-shaped aedeagus (Fig. 17). I have seen about 80 specimens, mostly from Riverside Co., California, but a few from San Diego Co. (Borrego) and Inyo Co. (Lone Pine). Out-of-state records are from Arizona (Parker, Yuma, Wellton), and Sonora (39 mi n. Puerto Peñasco).

Maricopodynerus shannoni Bohart

Maricopodynerus shannoni Bohart 1950: 24. Holotype male, Stratford, Washington (SAN FRANCISCO).

The short and nearly truncate clypeus (Figs. 3, 7), which is unusually flat in the

female and densely microsculptured in the male, are identifying characters.

Altogether, I have seen 18 specimens. Localities are Washington (Stratford, Lake Paha), Idaho (6 mi nw. St. Anthony), Nevada (3 mi w. Hazen, Yerington), and California (Siskiyou, Shasta, Mono, and Inyo counties).

Maricopodynerus sternalis Bohart, New Species

Male holotype.—Length 5.5 mm. Black, ivory, and red. Ivory are: elypeus except rim (Fig. 5), scape in front, ocular and postocular spots, pronotum anterodorsally, scutellar spots, metanotal band, tegular dots, upper mesopleural spot, small tibial spots, irregular recurved band on T-I, markings on T-II (Figs. 9, 22); lateral dot on S-II; red are: mandible apically, flagellum inside, tegula mostly, legs as far as tarsi mostly, T-I except posterior band, T-II basolateral spot, S-II mostly; forewing marginal cell darkened distally. Pubescence silvery, inconspicuous. Punctures of elypeus moderate, a little spaced by dense microsculpture; punctures of frons, vertex and notum moderate and close; those of T-II small, distinct, evenly distributed, spaced by about 1 PD of microsculpture (Fig. 16). Clypcal apex emarginate between sharp teeth (Fig. 5); F-XI small, not reaching base of F-IX; lateral ivory margin of T-II hardly swollen; cuspis without teeth.

Female.—About as in male except: length 6.5 mm, clypeus black with 2 ivory spots (Fig. 1), pronotal band broken submedially, tegula all red.

Holotype male, Townes Pass, Inyo Co., California, V-6-60 (A. S. Menke, DAVIS). Paratypes, 2 females, California: 12 mi s. Baker, IV-15-69 (E. E. Grissell, DAVIS); Argus Mts. (Inyo Co.), V-22-37 (N. W. Frazier, DAVIS).

Discussion.—The similar shape and markings of T-II indicate a relationship to decorabilis. However, in sternalis the maculate rather than all black clypeus (Fig. 1), mostly red rather than black S-II, and finely but distinctly punetate T-II, indicate a different species.

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